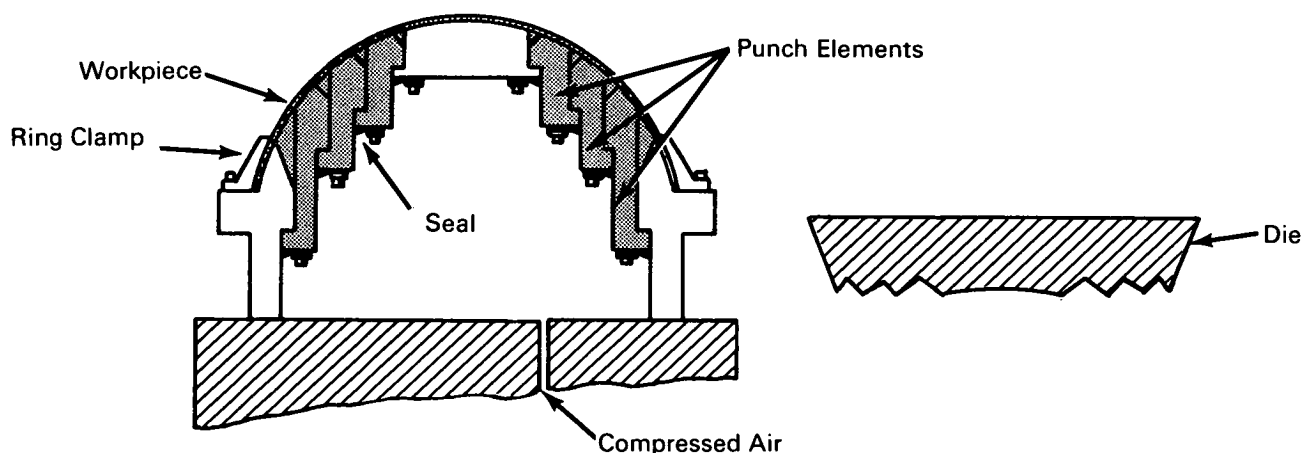


# NASA TECH BRIEF



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## Die and Telescoping Punch Form Convolutions in Thin Diaphragm



**The problem:** To form convolutions in thin dished metal diaphragms without stretching the metal too thin at sharp curvatures.

**The solution:** A die corresponding to the metal shape to be formed and a punch consisting of elements that progressively slide against one another under the restraint of a compressed-air cushion to mate with the die.

**How it's done:** The dished workpiece in which the convolutions are to be formed is securely fastened to the periphery of the punch by means of a ring clamp and screws. Compressed air is introduced into the punch cavity, forcing the punch elements into their expanded position, as shown in the illustration. The die is then brought into contact with the outer surface of the workpiece and forced against the punch. The punch elements yield against the air pressure and slide downward relative to one another, thus forcing the workpiece into the desired shape.

### Notes:

1. A punch and die set of this type will form convolutions in thin metal shapes without excessive thinning of the metal such as produced by conventional spinning methods.
2. Inquiries concerning this innovation may be directed to:

Technology Utilization Officer  
Jet Propulsion Laboratory  
4800 Oak Grove Drive  
Pasadena, California, 91103  
Reference: B65-10393

**Patent status:** NASA encourages commercial use of this innovation. No patent action is contemplated by NASA.

Source: Honeywell, Inc.  
under contract to  
Jet Propulsion Laboratory  
(JPL-SC-135)

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